

INSTALLING AND OPERATING INSTRUCTIONS FOR THE FISCHER  
"LO" SENIOR AND "FO" SENIOR DIATHERMY CABINETS.

Remove the caps from the four Leyden jars and, after a thorough cleaning, fill them with a saturate solution of salt water up to  $1/4$  inch above the level of the outer brass coating. Use one-half pound table salt to each jar. The fluid should be poured into the jars to just above the top of the outer coating, and immersing the carbons will increase the level to the desired point. A film of paraffin oil on the water (about  $1/4$  inch or so) will reduce evaporation.

Carefully replace caps on the jars, wipe them thoroughly dry, and set two on each side of the upper compartment in the small partitioned sections with metal bottoms. Connect the four wires leading from the sides of this compartment to posts on the tops of the carbons on the jars. Then connect the two sets of bifurcated cords leading from the front of the cabinet to the binding posts on the sides of the jars.

Should any moisture be present around the jars, dry thoroughly before using the machine.

The solution in the jars needs little attention, but it is advisable to make periodic observation to see that the level does not fall too low. Observe this every few days while the cabinet is new, and you may gradually lengthen this period from experience. Should the water level fall to or below the top of the outer brass coating, plain water should be added immediately.

If, for any reason, the solution of one jar needs replenishing, or you replace a jar, it is important that all jars be emptied and refilled with fresh brine as above instructed, to insure a perfect condenser balance.

The Milliampere Meter

Connect the short nickel-plated rod to post A on cabinet and to F on the meter.

Near the bottom of the meter, mounted in the glass face itself, is a small adjusting screw for the purpose of enabling the operator to move the needle back to zero when necessary. Turning this screw to the left or right moves the needle independent of the dial.

The Multiple Spark Gap (Kolischer)

Unscrew the two rods from the extreme ends and set the gap between the posts H and I on the cabinet; then set the end rods through the posts H and I, screwing them firmly into the ends of the gap.

The spark interrupter gap is the most important regulating feature on any high frequency generator. Its function is to regulate the discharge of the high tension current in connection with control No. 4 (on the top



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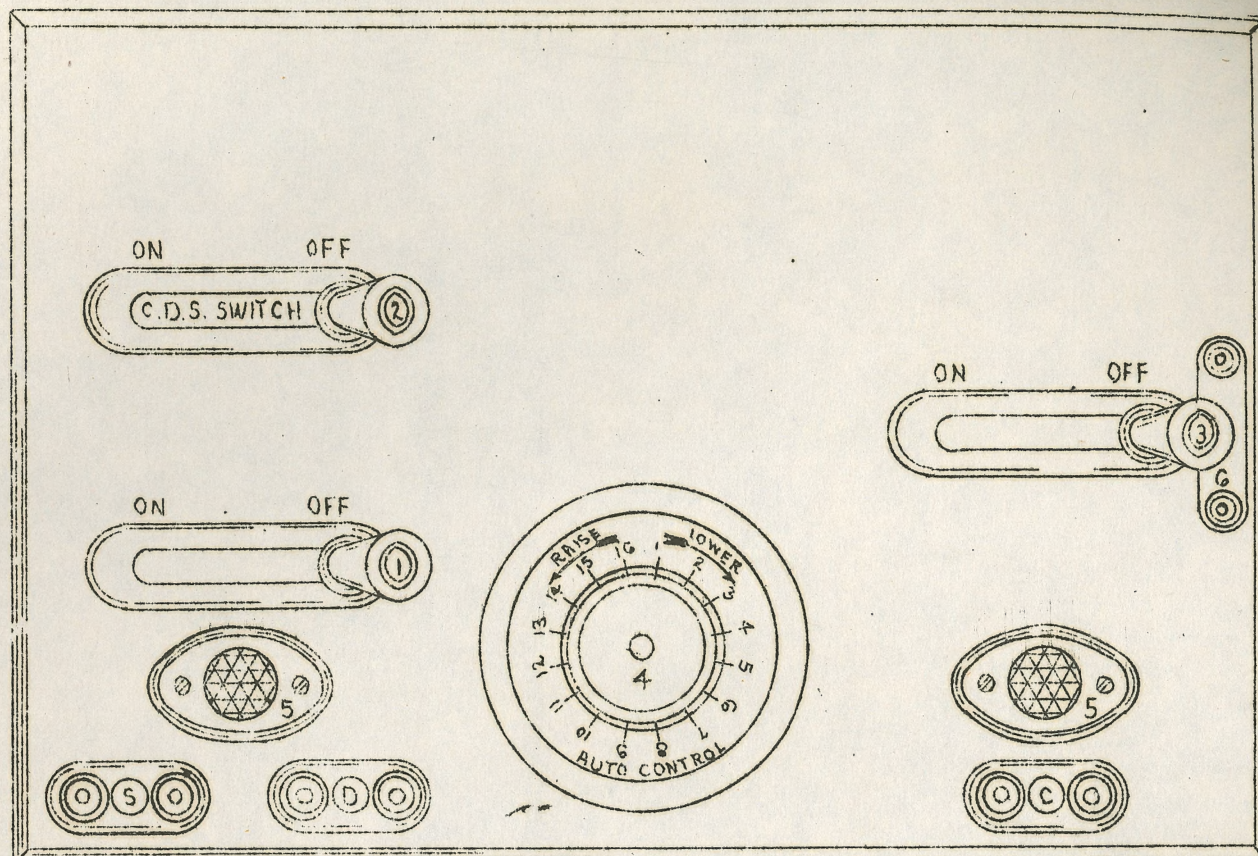
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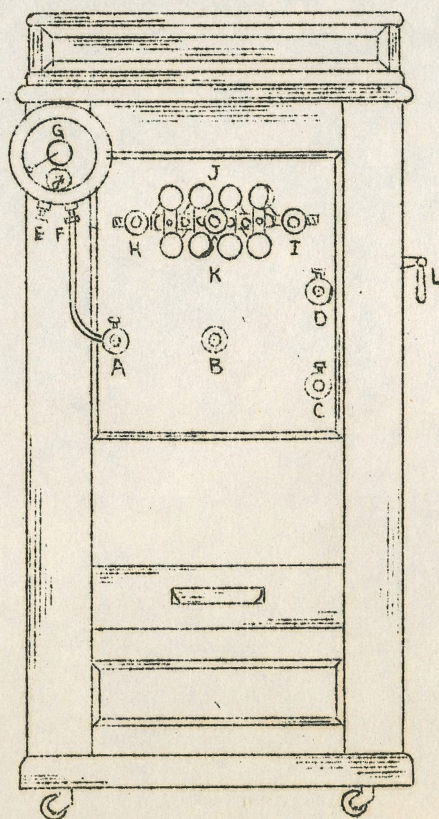
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DIAGRAMS OF THE FISCHER "LO" SENIOR AND "FO" SENIOR DIATHERMY CABINETS



- |   |                                   |
|---|-----------------------------------|
| 1 - Main Switch for Diathermy, Auto Condensation and High Frequency Modalities. | 5 - Pilot lamps (enclosed).       |
| 2 - Main Switch for Cautery, Diagnostic and Sinusoidal Currents.                | 6 - Foot Switch Terminals.        |
| 3 - Switch for throwing Foot Controller in or out.                              | S - Sinusoidal Terminals.         |
| 4 - Controller for Auto Transformer.  | D - Diagnostic Current Terminals. |
|   | C - Cautery Terminals.            |





switchboard) and may be adjusted either with the current on or off. When the tips are closed, there is a direct short circuit on the transformer and no discharge from any of the high tension outlets.

As these spark interrupter points are gradually separated, the high tension current passing across the gap produces an oscillating or vibratory effect (evidenced by sparking) which is increased up to that point where the voltage is insufficient and the sparking ceases. The highest rate of oscillations--that is, the highest frequency of discharge--is obtained with the spark interrupter points nearly closed. At this point also is obtained the very smoothest flow of current.

Wipe gap occasionally with a dry cloth. Dust forms a conductor and must be removed.

#### Main Switch No. 1

Controls the entire current entering transformer--the diathermy, auto-condensation and high frequency modalities. The "off" position is to the right as seen on the illustration. Throw switch as far to left as possible to close circuit.

#### Switch No. 2

Controls the cautery, diagnostic and sinusoidal currents, indicated on the illustration as outlets C, D and S (refer to drawing of top of cabinet). "Off" position is indicated. Throw handle to left as far as it will go, to close circuit.

#### Switch No. 3

Is used to throw the foot switch in or out of the circuit. Lever 3 in position as indicated on drawing on top of cabinet leaves an open circuit to be closed with the foot switch. Throwing lever 3 to the left as far as it will go closes the high tension circuits (the diathermy, auto-condensation and high frequency modalities) that is, when switch No. 1 is closed, and automatically cuts out the foot switch.

Neither lever 3 nor the foot switch terminal 3 nor the foot switch itself, has anything to do with the cautery, diagnostic and sinusoidal modalities.

#### Auto-Control No. 4

That the currents generated by this outfit may be at all times perfectly resonant, it is necessary that the voltage input to the main transformer be altered in exact proportion to the milliamperage desired, and the proper operation of the spark interrupter points. This regulating function is performed by auto-control No. 4.

Don't attempt to obtain maximum currents (diathermy, auto-condensation, etc.) with auto-control indicator on the lower settings, and don't set this auto-control indicator on the higher settings with the spark interrupter points nearly closed. Adjust one proportionately with the other, until you become familiar with the machine, and experience will tell you how to proceed later.



#### Pilot Lights No. 5

Indicate closed circuits; the one on the left-hand side the C, D and S currents, and the one on the right-hand side the diathermy, auto-condensation and high frequency modalities. These lamps are of 6.2 volt-age capacity.

#### Foot Switch Terminals No. 6

Tips on the end of the foot switch cable are to be inserted into the small sockets.

When the foot switch is to be operated, controller No. 3 is left in the "off" position (to the right).

#### Terminals "C"

Voltage available varies from 0 to 8, and the amperage over 100, which current output is increased or decreased by manipulating auto-control No. 4-- minimum cautery current is obtained with indicator on control No. 4 on point 1; maximum, when indicator is placed on point 16.

The cautery circuit is closed by switch handle No. 2. Tips on cautery cords are to slip into sockets at C.

#### Terminals "D"

The current volume from 0 to 12 volts is increased or decreased with the auto-control No. 4, point 1 being lowest voltage and point 16 highest. The tips on the ends of the diagnostic lamp cord are inserted into the two sockets at D. Close diagnostic circuit by throwing lever 2 to the left as far as it will go.

#### Terminals "S"

The current available from these outlets varies from 0 to 35 volts at a very small amperage, depending on setting of auto-control No. 4.

#### Binding Post "E"

Is used as one terminal when employing either the opposite poles C and D for diathermy or auto-condensation work.

#### Outlet "B"

The highest voltage high frequency terminal is to be employed in connection with monopolar discharges only. For use with high frequency vacuum and non-vacuum electrodes, fulguration, monopolar and indirect desiccation, etc. Have handle L down.



#### Outlet "C"

The lowest voltage diathermy outlet, to be employed mainly where the body resistance is not great. Will give best results when treating the thinner parts of the body and for electro-coagulation.

#### Outlet "D"

The highest voltage diathermy and auto-condensation terminal, used with bipolar applications in combination with outlet E through meter.

Practically all medical diathermy applications should be administered with connections made to outlets D and E and handle L DOWN.

The greatest volume of current will be obtained from the outlets D and E with the handle L UP, but the nature of the discharge is not as well suited to medical diathermy treatments as when the handle L is down. Using outlets D and E and the handle L up, however, delivers an exceptionally strong surgical diathermy (electrocoagulation) current.

#### Switch Control "L"

Is mounted on the end of a long insulated shaft which in turn is directly connected to the large high tension switch W inside the cabinet.

To obtain lowest voltage have the handle L turned up and use outlets C and E.

To obtain highest diathermy and auto-condensation voltage have the handle L turned down and use outlets D and E.

This control switch must be either pointing straight up or straight down--never at any intermediate setting.

#### Ground Wire

Is so connected within the cabinet as to protect your line wiring as well as any other appliances that you may have connected to the same line. It is necessary to connect this wire by means of a good clamp to a grounding medium (water pipe preferred), soldering all connections. Use a No. 14 B and S gauge wire, or heavier.

#### To Obtain Medical Diathermy

Set indicator on auto-control No. 4 on point 1. Switches Nos. 1, 2 and 3 must be in "off" position. Close the spark interrupter points with master controller K.

For the first test, place one cord tip in binding post E and attach the other cord to outlet D. The other ends of the cords are attached to the electrodes, and we will substitute a glass or bowl of salt water for the patient.



Clip off two small pieces of sheet block tin electrode material and attach them to the cords with the clips, Catalog No. 874. Clamp the cord tips in the clips and drop the pieces of metal into the brine, being sure they do not touch one another.

Close switch No. 1, then No. 3, and gradually open one pair of the spark interrupter points until the needle of the meter moves upward. As the points are separated the reading will increase. Snap auto-control switch No. 4 to point 2, open the spark points a bit more; advance switch No. 4 to 3,4,5, open the second pair of points; then the third pair, and increase and decrease the volume of current generated as indicated on the meter, until you become familiar with the controlling procedure.

Now try the other set of diathermy outlets E and C and you will find that as you increase the resistance of the water medium and try various settings of auto-control No. 4, as well as the Kolischer spark gap, that the readings will be quite different as compared to current generated when employing outlets E and D.

Don't attempt to apply the electrodes to a patient, or to yourself, until you have become thoroughly familiar with the apparatus.

#### To Obtain Electro-Coagulation Current

Set indicator on auto-control No. 4 on point 1. Switches Nos. 1, 2 and 3 must be in "off" position. Spark gap closed.

It is customary when speaking of electro-coagulation technic to refer to the active and indifferent electrodes; the former active electrode being the small point or disc which is placed in direct contact with the diseased tissue and the latter, the indifferent electrode, a larger metallic plate to cover a great deal of skin surface without danger of destroying healthy tissue, which is placed preferably on the opposite side of the body or at least adjacent to the point of operation.

Make connection from indifferent electrode to binding post E. Connect the active electrode to outlet C.

Lay a piece of raw meat on a flat plate, to serve as the patient for the preliminary test. Grasp the well insulated handle of the active electrode at least 2 inches away from the metal end and preferably with the flexible connecting cord passing back over the hand. A foot switch should be employed, with the terminals set in outlets 6 on the top plate.

Close switch No.1, open one pair of spark interrupter points slightly, step on the foot switch to close the circuit, leaving switch No. 3 in the "off" position, or if the foot switch is not employed throw switch handle No. 3 to the left, bring the point of the active electrode down to the meat and you will observe sparks from the point of contact and some small reading on the milliamperemeter. Increase and decrease the current by adjusting the spark point back and forth, using one pair, two or any number that you may desire, and at various settings of auto-control No. 4.



Observe how the milliamperage will vary with the different settings; hold the electrode away from the meat a short distance to cause sparking; now make contact on the surface to produce a blanching effect; press the tip of the electrode into the meat and notice how you can produce varied depths of desiccation, coagulation and blanching and how the meter needle vacillates with each different type of application. To be brief, try a series of experiments along this line to familiarize yourself with the current action before trying any applications on living tissue.

Many operators fearing the danger of burning out the meter as a result of accidentally touching the two electrodes with the current on when performing electro-coagulation operations where the active and indifferent electrodes come quite close together, prefer to disconnect the meter and take current directly from terminals A and C.

#### To Obtain d'Arsonval Auto-Condensation

First, and always see that switches 1, 2 and 3 are in the "off" position. Set indicator on auto-control No. 4 on point 4. Spark gap closed.

Place the heavy auto-condensation cushion, Cat. No. 420, on your table and connect same with one of the rubber covered cords to binding post E.

If the patient should be reclining comfortably on this pad, and if pillow is used it should be placed under the pad in preference to immediately under the patient's head, because in the latter event too much of the body is too far removed from the electrode in the pad itself. Connect other rubber covered cord from outlet D to the long nickel-plated auto-condensation handle, Catalog No. 58, which handle is held firmly in the patient's two hands. Always place a folded towel or other similar medium under the hands to prevent any possible leakage from the handle to the body.

Close switch No. 1 and then No. 3, and gradually open the spark interrupter points until a smooth flow of current is obtained, but not so far that the discharge becomes noisy or uneven in character. The current is increased and decreased by means of auto-control No. 4, as well as the spark interrupter points. It is not necessary to employ individual pairs of points when administering an auto-condensation treatment, but rather have all points equal distances apart and then adjust with the master controller K.

#### To Excite Glass High Frequency Electrodes

Set indicator on auto-control No. 4 on point 3. Switches Nos. 1, 2 and 3 must be in "off" position. Spark gap closed.

Connect the heavily insulated cable, Catalog No. 83, to the outlet B and to the small ring on the end of the high frequency electrode, Catalog No. 9. Close switches 1 and 3 and gradually open the spark interrupter points until a glow of violet light appears in the bulb. Current volume is regulated two ways, by the auto control No. 4 and the spark interrupter points.



Other glass vacuum and non-vacuum electrodes are connected and operated in the same manner.

### Cautery

See that all three switches, Nos. 1, 2 and 3 are in the "off" position. Switches Nos. 1 and 3, and all of the outlets and appurtenances on the front of the outfit, are to be ignored when using cautery.

Set tips of heavy rubber covered cords into outlets C on top of cabinet and connect other ends to the cautery handle, Catalog No. 301. The cautery knife is mounted in the opposite end of the handle, in any one of five positions, one of which is illustrated. The cautery knife should never be heated beyond a cherry red.

Throwing switch handle No. 2 to left closes the circuit, and the volume of discharge is increased or decreased with the auto-control No. 4; point 1 being lowest, and point 16 being highest.

### Sinusoidal

See "Cautery" instructions.

The rubber covered cords are to connect from the outlets S on top of cabinet to either the metal treatment handles, Catalog No. 614, or to specially designed pads or electrodes to suit the individual case. The circuit is closed with switch handle No. 2, and the volume of discharge is increased or decreased with auto-control No. 4.

### Diagnostic Illuminator

The three switches Nos. 1, 2 and 3 must be in the "off" position, and auto-control No. 4 on point 1. Switches Nos. 1 and 3 and all of the appurtenances on the front of the cabinet, are to be ignored when using this modality.

Set the tips on the end of the diagnostic illuminator into the outlets D on top of cabinet. Throw switch handle 2 to left and gradually increase current to lamp by advancing indicator on auto-control No. 4 one step at a time until a coloring just short of white is obtained in the bulb. Going beyond this point will burn out the lamp.

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